A DAY AT THE CAPITAL CHILDREN'S MUSEUM

by Melanie Graves

On a brick arch above the entrance to the courtyard of the Capital Children's Museum in Washington, D.C. is etched an ancient Chinese saying: "I hear and I forget; I see and I remember; I do and I understand." Inside the museum, visitors can make tacos in an exhibit called Mexico, don firefighting outfits in the City Room, or program computers in the Future Center, which is where I teach.

During one of my days off, my twelve-year-old friend Sarah and I went to the museum to explore the computers. There are several dozen computers scattered throughout the building which are used for exhibits, classroom teaching and the development of educational software.

The Computer Exhibits

A machine that calls itself "Wisecracker" is the noisest of the computers that beckon visitors to the Communication exhibit. "My-name-is-Wise-crack-er," it says in a monotone, "Come-type-to-me." This message repeats endlessly until someone types at the keyboard or turns off the computer. "Hello, how are you?" Sarah typed, and pressed the return key. "Hel-lo-how-are-you," the machine's voice responded. "I asked you first," Sarah typed. "I-asked-you-first," said the voice. Sarah typed for awhile longer and then proclaimed, "It sure is dumb, but its voice is kind of cute."

The computer next to Wisecracker has a data base (information-gathering) program that asked Sarah her name, where she came from, and other questions. It informed her that she was the thirty-seventh person from Virginia to type in data that day, and printed out the responses other visitors had typed. "Fifty-five percent of the people who came here were girls," she told me.

Next to the data base, a computer is set up with a music program. Sarah pressed some random keys, causing notes to sound. At the same time, the letter names of the notes appeared on the keys of a piano that was displayed on the screen. She picked out the tune "Row, row, row your boat."

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Photo by Lillian M. O'Connell

Children get hands-on experience at the Future Center in the Capital Children's Museum.

Photos compliments of Capital Children's Museum.

School children get a lesson at the Capital Children's Museum.

"What's that?" she asked, pointing to a large picture on the wall. It looked like an aerial photo of several city blocks with lots of houses and telephone wires. "It's a photograph of a microprocessor enlarged one hundred thousand times, which is made from tiny pieces of silicon," I answered. "That's where computers do most of their work. Electrical currents travel along those wires and enter the houselike objects which are called transistors. Currents come out of each transistor in different ways depending on what sort of current went in and what sort of transistor it is. The microprocessors in the computer you've been using are about a quarter-inch long; if you look over here, you can see one through this microscope. When magnified forty times, you can see that this tiny chip is what the enlarged photograph was made from."

Not far from the silicon chips is a corridor with life-sized photographs of Whirlwind, one of the first modern computers, built in 1950. The photographs are displayed along with dozens of vacuum tubes and other components, and give the impression of standing next to the enormous computer. Five thousand of these vacuum tubes were required to build the Whirlwind, which cost $5 million and occupied three large rooms. Today, those thousands of vacuum tubes are replaced by tiny transistors built on one silicon chip. Three times the amount of computing power that the Whirlwind made available now costs about $1,000 and occupies a square foot of space. An Atari 400 is displayed with its cover off to illustrate this transformation.

Nearby is a simple counter that increments or decrements numbers by one, both in decimal and binary, whenever a "plus" or "minus" button is pushed. The binary numbers are represented both as ones and zeros and as a row of lights. Sarah pushed the buttons awhile, and soon was more comfortable with the concept of binary numbers.

Computers are not only a primary focus of the exhibit on the history of human communication, but have also been integrated into other exhibits throughout the museum. They are used in the 19th-century section of the Communication exhibit in teaching children to send Morse Code messages via blinking lights, in the Metric exhibit to teach children the length of a centimeter, and in the Patterns and Shapes exhibit as an electronic form of crayons and paper.

There is also a Teletext terminal that tells inquirers about weather predictions, and news releases, the latest acquisitions at the public library, local cultural events and whatever else has been entered into the data base for that day. When Sarah pushed a button on the Teletext to learn more about local events, it asked her if she wanted to know about movies, music, dance or sports. By pressing more buttons, she filled the screen with movie reviews and the theaters at which they were playing.

The Future Center

After playing with Teletext, Sarah and I went to the Future Center, a room equipped with twenty Atari 800s. On weekdays, the classroom is available to school groups ranging from prekindergarten to high school. On weekends, families arrive for courses in programming. Classes have also been created for working people, senior citizens, community groups, congressional spouses and other special interest groups. This summer more than sixty students from the Washington, D.C. public schools

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attended one of two free month-long computer camps at the museum.

The Capital Children's Museum is located in an inner-city neighborhood, and about half of the students who come to the Future Center are from minority groups. Children who live in the immediate vicinity of the museum can be members of a group called the MET-kids. These children can come to the museum everyday after school and during the summer for free activities, which include occasional visits to the Future Center.

On the day Sarah and I came to Future Center, a third-grade class from Maryland had just arrived for its first visit. The two Future Center teachers, John Brown and Anne Applegarth, gave a verbal introduction and taught programming for the first hour of class. The students then played educational games for the next half-hour.

"How many people here have used computers before?" John asked the class. About half of the students raised their hands. "Did you know that the machine that takes your farecards in the Metro stations is a computer? . . . Now how many people here have used computers before?" This time each one raised a hand. "Computers come in all sorts of sizes and shapes," John continued, "and they are used for all kinds of tasks..

"People who teach computers how to do their jobs are called programmers. Today you will all learn how to program these machines to draw pictures. But first, who can tell me some different ways to give computers information so they can do what programmers have taught them to do? For example, how is information given to computers in the Metro?"

"You stick a farecard into a slot and the computer can tell where you got on," a student said. "That's right," John said. "And then the computer subtracts the amount of money you owe from the value on the card, and returns your card. How else do computers receive information?"

"By typing," someone said. "Right again," said John. "We'll be typing at these keyboards when we draw our pictures. Any other ideas?"

There was silence a short while, so Anne asked "How about at the grocery store? Does anyone know what the bar codes look like on your cereal boxes that the computer at big grocery stores read?" A student raised her hand and then went to the blackboard to draw a picture of a bar code.

"You can also talk to computers," another student offered. "Primo!" Anne said. "Some of the computers that understand voice are used by people whose arms and legs are paralyzed. A computer can be taught to turn off lights for them when they say 'Turn off the lights' or to display stories on a screen when they say 'I want to read.' So far, though, computers are not very good at recognizing variations of speech. Just because a computer learns to understand one person says 'Turn off the lights' doesn't mean it will understand anyone else who says the same thing. Each person who wants to talk to a computer has to teach the computer what his or her voice sounds like saying each phrase the computer is supposed to understand. But maybe next year's model will be better."

After conversing about input mechanisms, the class from Maryland learned to draw pictures using Atari PILOT's version of "turtle" graphics. First, Anne pretended that she was a turtle and John told her what to do by giving her computer instructions. "Draw 10," he said, and she took ten small steps. Then the children were asked to give Anne verbal instructions, so she swirled and stepped and changed the color of the books on her head depending on what the children said. After each move, all the students repeated the most recent instruction out loud. Next Anne wrote a simple program on the blackboard for the children to type into their computers, and told them to RUN their programs after each DRAW command. Soon some of the children asked if they could draw their own pictures. Anne continued to provide structure to those who wanted it, while John helped those who were ready to work on their own.

As the students from Maryland finished creating designs, Anne ran a game program called *Balloon*. John went to the blackboard to explain the concept of fractions.

We also saw children playing other games. One, called *Sequence*, puts different shapes on the screen in patterns, and then asks the students which shape comes next in the sequence. Another game, *Pattern Recognition*, quickly shows a figure,

and then asks students to pick out the figure they saw from among four options.

And then there is *PAINT* . . .

SuperBoots

There was a fifteen-minute break after the class from Maryland left, so I loaded *PAINT* into two computers. *PAINT*, written by the software development arm of the Capital Children's Museum, SuperBoots, encourages even four-thumbs me to feel like I have potential as an artist.

By moving our joysticks, Sarah and I created drawings on our screens. We could use any of Atari's 150 shades of color, or we could create checkerboard patterns with those colors and use those patterns on our invisible "brushes." We could also change the width of the "brush" stroke, or its texture, or how fast it moved. We created circles, rectangles and lines by pressing specified keys, and then we filled those shapes with colors. We zoomed in to work on our pictures in detail, and then zoomed back out, just like a movie camera, to see what the whole picture looked like.

One of the features I like most about *PAINT* is that different versions of the drawings can be saved on disk. Sarah saved a picture of a purple rhinoceros. The drawing was still in the computer's memory, so she changed the color of the rhino to green, and saved the picture again. She saved several more versions, and at the end, created an "art show" whereby all of her pictures were shown on the screen in succession.

"That's a great art show," I told her. "And now here's another group arriving. It's time for us to go." □

Interested in Visiting the Museum?

The Capital Children's Museum exhibit hours are 10 A.M. to 4 P.M. daily; closed on Monday. Admission fee is $1 for children, $2.50 for adults. Groups of ten or more must have reservations.

Preregistering well in advance for the Future Center (which has a separate admission fee) is recommended. Weekday classes cost $4 per student for each hour-and-a-half lesson. Weekend and evening classes are more expensive. The Future Center is occasionally open to individual visitors who pay $4 for a ticket to use a computer for an hour, with two people admitted per ticket.

In addition to *PAINT*, SuperBoots wrote most of the software used in the exhibits and in the Future Center, and is currently working on a music program. *PAINT* is available from Reston Publishing Company. Other programs may be obtained directly from the museum.

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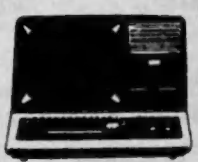

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